



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,968	09/05/2003	Daniel P. Carter	884.467US2	1652
21186	7590	10/24/2005		
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH 1600 TCF TOWER 121 SOUTH EIGHT STREET MINNEAPOLIS, MN 55402			EXAMINER OMGBA, ESSAMA	
			ART UNIT	PAPER NUMBER
			3726	

DATE MAILED: 10/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/656,968

Applicant(s)

CARTER ET AL.

Examiner

Essama Omgba

Art Unit

3726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 September 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/12/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 12, 2005 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 15 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Liang et al. (US Patent 6,525,939).

Liang et al. discloses making a heat sink, the method comprising forming fins 65 of thermally conductive material which extend outwardly from a core 210 in an asymmetrical pattern, the core having a central axis (owing to the fact that the core is a cylinder, col. 3, lines 13-14), each fin having a base coupled to the core substantially

Art Unit: 3726

parallel to the central axis (figure 3), each fin having a tip, wherein a face has a periphery defined by the fin tips, wherein the face is to face a heat-generating electrical component (col. 3, lines 17-20), and wherein the face comprises inter-fin openings (the space between each fin tip).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 5, 6, 16, 17, 19, 20, 23, 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al. in view Mira (US Patent 5,661,638).

Liang et al. discloses a method of making a heat sink as shown above including curved fins. Liang et al. does not disclose bending each fin, and separating a portion of the fin from the core. However Mira discloses that the fins (22) have portions that are straight (the portions of the fins 22 that terminate at the corners of heat sink 20 in figure 5) and portions that are bent in substantially the same relative direction (figure 3). Furthermore Mira discloses separating the bend portion of each fin (22) from the core (24) in that the midpoint of the fin 22 is separated from the core and bent (figure 3). The bending of the fins is advantageous in that it effectively increases the surface area of each fin, thereby increasing the amount of heat dissipation. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to

Art Unit: 3726

have a heat sink as disclosed by Liang et al. with bent fins, in light of the teachings of Mira, in order to increase heat transfer efficiency.

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al.

Liang et al. discloses a method of making a heat sink as shown above. Although Liang et al. does not disclose the specific aspect ratios and dimensions claimed, however it would have been obvious to one of ordinary skill in the art at the time the invention was made that the specific aspect ratios and dimensions are merely a design choice and it would have been obvious to one of ordinary skill in the art to adjust the ratios to achieve the desired cooling effect for a given application.

7. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al. in view of Applicant's Admitted Prior art (AAPA).

Liang et al. discloses a method of making a heat sink as shown above except for forming a cavity in the core and inserting a copper plug into the cavity. However Applicant, at pages 2, 3 and 6-9 of the specification to be known as AAPA, teaches forming a cavity in the core along a central axis and inserting a copper thermal plug into the cavity (figure 4 of the specification). The forming of the cavity to receive a copper thermal plug is advantageous in that it facilitates heat transfer from the heat source to the fin members wherein convective heat transfer may be performed. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have formed a central cavity in the core of the heat sink of Liang et al. with a copper thermal plug inserted in the cavity, in light of the teachings of AAPA, in order to realize

Art Unit: 3726

the above cited advantages. AAPA also discloses that it is well known to fabricate fins of a heat sink via extrusion, which inherently requires a die.

8. Claims 4, 7, 8, 18, 21, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al./Mira as applied to claims 3, 17 and 24 above, and further in view of Applicant's Admitted Prior art (AAPA).

Liang et al. discloses a method of making a heat sink as shown above except for forming a cavity or channel in the core and inserting a copper plug into the cavity. However Applicant, at pages 2, 3 and 6-9 of the specification to be known as AAPA, teaches forming a cavity or channel in the core along a central axis and inserting a copper thermal plug into the cavity (figure 4 of the specification). The forming of the cavity to receive a copper thermal plug is advantageous in that it facilitates heat transfer from the heat source to the fin members wherein convective heat transfer may be performed. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have formed a central cavity in the core of the heat sink of Liang et al. with a copper thermal plug inserted in the cavity, in light of the teachings of AAPA, in order to realize the above cited advantages. AAPA also discloses that it is well known to fabricate fins of a heat sink via extrusion, which inherently requires a die.

### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1, 15 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 3726

10. Applicant's arguments filed September 12, 2005 as they relate to claims 2-14, 16-21 and 23-28 have been fully considered but they are not persuasive.

Although the primary reference has been changed, the examiner would like to answer Applicant's arguments in case Applicant wants to present the same arguments in relation to the new reference.

In response to Applicant's potential argument that combining the teachings of Liang et al. and Mira would defeat the goal of Liang et al., which is to vent air completely through the fins and it would also defeat the goal of Mira which is apparently to stop the downward movement of air through fins at the bottom surface, the examiner respectfully disagrees. Modifying the fins of Liang et al. in by bending them in the manner taught by Mira will not prevent venting air completely through the fins. As outlined above in the rejections, bending the fins in the manner taught by Mira increases heat transfer efficiency by increasing heat transfer surface, this is true whether or not the air is vented completely through the fins or downward movement of air through the fins is stopped.

In view of the above remarks, the examiner maintains that a prima facie of obviousness has been established with regards to claims 2-14, 16-21 and 23-28.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 3726

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Essama Omgba whose telephone number is (571) 272-4532. The examiner can normally be reached on M-F 9-6:30, 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Essama Omgba  
Primary Examiner  
Art Unit 3726

eo  
October 19, 2005